PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to the Manufacture of Variegated Plastic Sheet Material

We, ARMSTRONG CORK COMPANY, a corporation organised under the laws of the State of Pennsylvania, United States of America, of Lancaster, Pennsylvania, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the manufacture of variegated plastic sheet material having a ground or base of one or more colours and a veined or swirl-grain pattern of contrasting or variegating colour or colours, generally similar in appearance to marble.

Plastic sheet material, such as asphalt tile, used generally for floor covering, has been made in the past by working the base mix and variegating colour on a two-roll mill, stripping the material from the mill in the form of a sheet, cutting the sheet to the desired width, and then feeding the sheet in the cross-grain direction to a sheeting calender. This method requires that the sheets be handled individually by an operator between the mill and the calender. The separate pieces produced by this method, furthermore, have to be overlapped properly before the calendering in order to obtain uniform graining, and this operation requires a high degree of skill if heavy scrap losses resulting from improper graining at the points of overlapping are to be avoided.

We have invented a novel method of making variegated plastic sheet material such as asphalt tile or linoleum whereby the aforementioned objections to the previous practice are entirely overcome. According to the invention there is provided a method of making variegated plastic sheet material, which comprises extruding a mixture of ground and variegating colour compositions into mottle-coloured rods, feeding a mass of such rods into the nip of a sheeting calender with the length of the rods generally parallel to the axes of the calender rolls and in such a manner as to maintain a bank of said rods in the nip, and compressing the mass of mottle-coloured rods into the nip and through the calender rolls to unite the rods into a variegated sheet.

The extruding operation serves to effect the principal spreading of the variegating or mottle colour through the base mix. Passing the extruded rods through the sheeting calender creates the swirl grain by spreading laterally of the rod axes the mottle colour already spread longitudinally as a result of the extrusion.

In order that the invention may be clearly understood and readily carried into effect the same will now be described more fully with reference to the accompanying drawings in which:

Figure 1 is a plan view showing the arrangement of an extrusion press and a sheeting calender for processing a mix having a variegating or mottle colour composition distributed therethrough into a continuous strip of plastic sheet material exhibiting a swirl-grain pattern; and

Figure 2 is a side elevation thereof.

In practicing our invention, we prepare the base mix by charging the ingredients into a suitable mixer and working them therein for the required time. In making asphalt tile, the usual proportions of binder, filler and colour may be employed. If "Vinylite" (Registered Trade Mark) tile is to be made, the following compositions will be found satisfactory:

[Price

Price

"Vinylite"	100 pounds
Plasticizer (Tricresyl phosphate)	80 pounds
Stabilizer (White lead)	3 pounds
Filler and Pigments	417 pounds

When the base composition has been sufficiently mixed, we add to it lumps of premixed mottle colour composition, which may be similar to the base composition except that a pigment of different colour value is used, and continue the mixing for a limited time to insure distribution of the mottle colour composition throughout the mix without causing it to be thoroughly blended therewith. That is to say, the mixing after the addition of the mottle colour composition is terminated when the lumps of mottle colour composition have been more or less uniformly dispersed throughout the mix. The mix is then discharged from the mixer and charged into a piston-type extruding press, such as that indicated diagrammatically at 10.

The extruding press 10 is of known construction, including a cylinder having perforations 11 at one end and a piston (not shown) for pressing the contents of the cylinder through the perforations. By operation of the press, the base mix with the lumps of mottle colour composition distributed therethrough is discharged in the form of rods or strands 12 onto any convenient receiving support such as a belt conveyor 13. Any convenient means may be employed for cutting the strands or rods to the desired length or they may simply be looped back and forth across the width of the conveyor without actual severance.

The extrusion of the mix into rods or strands causes the mottle colour composition spread longitudinally thereof. It also tends to orient the fibres of the filler material, e.g., asbestos, in the direction of the length of the rods. If round rods are extruded, they preferably have a diameter of $\frac{1}{4}''$ or less. The rods may, however, be in the form of flat ribbons, say $\frac{1}{2}''$ wide and $\frac{1}{8}''$ thick, for example. While the rods or strands have been shown in the drawing as cut to exact lengths and arranged in regular order, this is not essential. In fact, a more or less random distribution of the rods on the conveyor is not objectionable. Generally it will suffice to have an operator standing near the delivery end of the extrusion press to see that the rods are distributed and arranged on the conveyor with some degree of regularity approaching more or less nearly the precise distribution illustrated.

The conveyor 13 delivers the rods or strands 12 into the nip of the upper pair of rolls 14 of a two-pass calender 15, the lower pair of rolls of which are designated 16. The calender construction is more or less conventional. The operation thereof converts the rods or strands delivered thereto by the conveyor 13 into a continuous strip 17. As illustrated in the drawings, the conveyor 13 delivers extruded rods to the calender at a sufficiently rapid rate such that the rods are bunched or grouped in the nip of the rolls. The desired condition in this respect can readily be obtained by correlating the speed of the calender and the rate of delivering the extruded rods thereto.

As shown, the rods lie on the rolls generally parallel to the axes thereof, although here again the precise relation illustrated need not be achieved in practice. In fact, a considerable angularity (horizontal and/or vertical) of the rods relative to the roll axes and to each other has no detrimental effect. The rods may even be gathered or bunched in masses by hand and dropped onto the rolls in that form.

The upper rolls 14 of the calender squeeze the rods together, uniting or amalgamating them into a continuous strip, the width of which is roughly equal to the average length of the rods and having a thickness determined by the spacing between the rolls 14, preferably about $\frac{1}{4}''$. The calendering of the rods causes the mottle colour composition to be spread laterally, i.e., at right angles to the length of the rods or in the direction of the length of the strip. The calendering also tends to orient the filler fibres in a direction transverse to the length of the rods. The calendering strip, therefore, is characterized by proper distribution of the mottle colour composition and filler fibres in both directions.

The rolls 16 perform a finish calendering on the strip, reducing it to final gauge, say $\frac{1}{4}''$, and elongating it correspondingly and causing a further lateral spreading of the mottle colour composition. The finished strip may conveniently be delivered onto a belt conveyor 18 and carried to suitable shearing apparatus for trimming the side edges to the desired width and cutting the strip into blocks or pieces of the desired length.

It will be apparent that our invention makes possible the production of a continuous strip of plastic sheet material having a swirl-grain pattern contrasting in colour with the base mix or ground,

without requiring any manual handling of the material during either the extrusion or calendering stage. We thus save the manual labour involved in the prior practice because of the necessity for turning the sheets or blankets between the initial milling and the final calendering to assure distribution of the colour in both directions. A more important advantage is the fact that the finished product is free from joints, such as resulted from the lapping of successive pieces made according to the previous practice. This avoids the necessity for the skilled labour required to obtain uniform graining across the joints as well as the certain amount of scrap loss which is inevitable even when the highest skill is exercised in making the joints.

The product exhibits a highly attractive swirl-grain pattern with both an asphalt tile mix and a "Vinylite" tile mix. It has been difficult to secure a marbleized effect in the latter methods of manufacture used heretofore because of the high viscosity and toughness of such compositions. The graining is comparable to that obtained by first milling the base mix and then cross rolling separate pieces thereof in accordance with the prior practice. The invention however, avoids the manipulative operations incident thereto such as cutting the sheets taken from the mill and folding or turning them prior to final calendering.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A method of making variegated plastic sheet material, which comprises extruding a mixture of ground and variegating colour compositions into mottle-coloured rods, feeding a mass of such rods into the nip of a sheeting calender with the length of the rods generally parallel to the axes of the calender rolls and in such a manner to maintain a bank of said rods in the nip, and compressing the mass of mottle-coloured rods into the nip and through the calender rolls to unite the rods into a variegated sheet.

2. A method according to claim 1, in which the mottle-coloured rods have a sectional area not substantially greater than .06 square inches.

3. A method according to claim 1 or 2, in which the mottle-coloured rods are generally cylindrical and have a diameter not substantially greater than $\frac{1}{4}$".

4. A method according to any one of the preceding claims, including as an additional step the passage of the variegated sheet between a pair of sheeting calender rolls for reducing the thickness of the sheet and further blending the colour compositions.

5. The method of making variegated plastic sheet material substantially as hereinbefore described.

6. Variegated plastic sheet material whenever prepared by a method according to any one of the preceding claims.

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[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

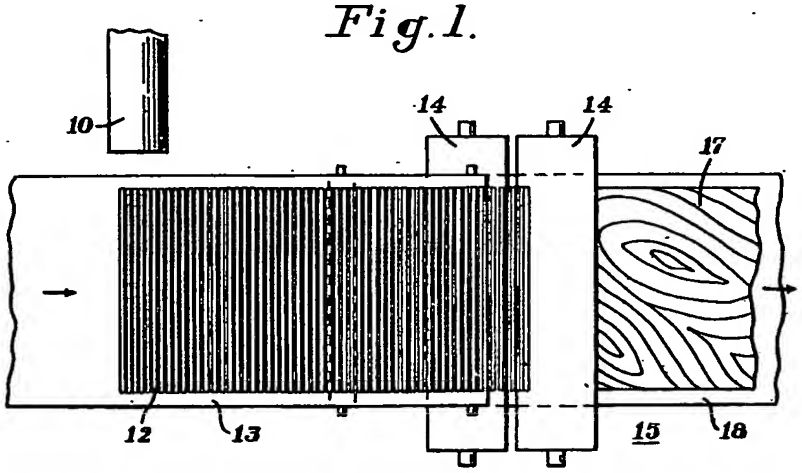
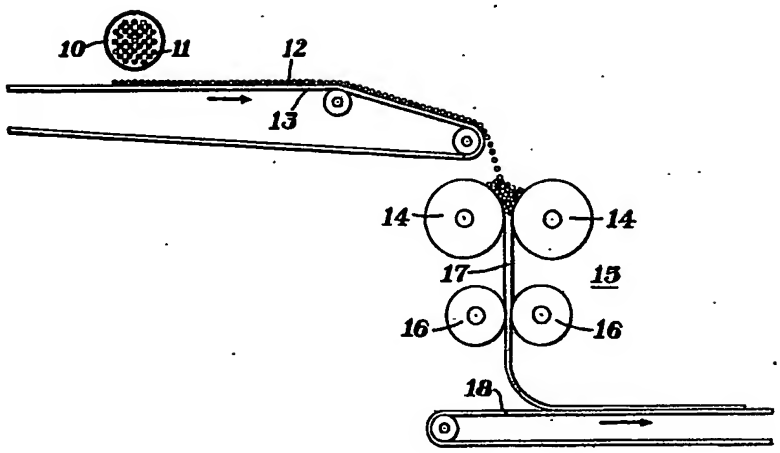


Fig. 2.



H.M.S.O. (Ty. P.)